ORIGINAL

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of

Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service	)	ET Docket No. 95-18 RM-7927

To: The Commission

COMMENTS OF COMSAT CORPORATION

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SUMMARY

COMSAT Corporation ("COMSAT"), through its COMSAT Mobile Communications division, offers its comments in support of the Commission's rule making concerning the allocation of spectrum in the United States at 2 GHz for global mobile satellite service ("MSS") operations. In our Comments, we demonstrate that the Commission's proposal, which requires MSS operators to pay to relocate existing users in both the MSS uplink and downlink bands in the United States, could cost the MSS industry a staggering $3.0 billion. This relocation expense, which exceeds the projected $2.6 billion cost of the fully implemented I-CO Global Communications satellite system, does not even include the costs associated with the Commission's proposal to auction MSS licenses.

In addition, we are concerned that the Commission's proposal for global MSS band extensions does not contain a plan to make the band extensions usable internationally. Based upon our efforts over the past several years to make the WARC-92 2 GHz allocations useful for global MSS, we firmly believe that WRC-95 is not prepared at this juncture to allocate new spectrum to MSS.

Despite these concerns, COMSAT believes that it is possible to devise a comprehensive plan to allocate spectrum at 2 GHz to global MSS systems that is economically and technically feasible to implement and consistent with international efforts. This belief is based on our analysis of the impact of MSS downlinks on fixed microwave systems operating in the U.S. at 2 GHz. Our

studies demonstrate that fixed services can, in fact, satisfactorily share spectrum with MSS downlinks, and do not need to be relocated.

Accordingly, we are proposing an alternative plan based on this assumption, and on additional studies performed by COMSAT which indicate that MSS uplinks can be accommodated at 2 GHz through a two-phase rechannelization of the broadcast auxiliary band. We believe that our alternative plan can be implemented over time, with the full cooperation of the international community, to address the concerns of existing U.S. operators in the 2 GHz bands and to remove the technical and economic barriers to global MSS operations at 2 GHz.

TABLE OF CONTENTS

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To the Commission:

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COMSAT Corporation ("COMSAT"), through its COMSAT Mobile Communications division, hereby submits its Comments in response to the Commission's Notice of Proposed Rule Making ("NPRM")[1] in the above-captioned proceeding.

I. INTRODUCTION

This rule making, concerning the allocation and use of spectrum at 2 GHz for global mobile satellite service ("MSS") operations, is extremely important to COMSAT and to its partners around the world who are investors in the planned I-CO Global Communications, Ltd. ("I-CO") global satellite system. I-CO plans to utilize the 2 GHz MSS bands allocated at WARC-92 to bring personal mobile services to the marketplace before the turn of the century using handheld user terminals and satellites employing advanced technology.

This proceeding also is important to the entire U.S. mobile satellite industry, which was united in its support last spring on the vital need for usable spectrum for these advanced satellite services during the Commission's personal communications services ("PCS")

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[1] Notice of Proposed Rule Making, ET Docket No. 95-18, released January 31, 1995, ("NPRM").

proceeding. Indeed, while this is a domestic proceeding, the Commission's decision will directly impact global providers and users of personal mobile satellite services in countries around the world since it addresses common global spectrum allocations. Having ready access to usable spectrum in world markets is a prerequisite to creating a business climate that attracts investments in global satellite systems. The U.S. market is, of course, key to any successful global system and we commend the Commission for following up on its commitment in the PCS proceeding to address the urgent need for MSS spectrum and to initiate this proceeding. We are prepared to work with the Commission to accomplish the objectives set out in the NPRM. However, we disagree with several aspects of the Commission's proposal and are proposing in Section V herein, a comprehensive transition plan as an alternative.

We believe that the Commission's proposal, which requires MSS operators to pay to relocate existing users in both the uplink and downlink MSS 2 GHz bands, would cost the MSS industry upwards of $3.0 billion dollars just to relocate existing 2 GHz facilities within the United States. This expense is more than the projected $2.6 billion cost of the fully implemented I-CO system. While the relocation costs alone would likely price any global MSS operator out of the U.S. market, the Commission also has indicated its intent to auction spectrum for 2 GHz MSS licenses, and has failed to consider the likelihood that other countries may do the same.

Moreover, we are concerned that the Commission's proposal to extend the uplink MSS band at 2010-2025 MHz and the downlink MSS band

at 2165-2170 MHz does not include any plan to make the band extensions usable internationally, and we are convinced that the WRC-95 Conference will not allocate new spectrum to MSS. This belief is based upon our efforts over the past several years to make the WARC-92 2 GHz allocations useful for global MSS. With a transition plan, such as we articulate in this filing, there is at least a chance that the world would cooperate at WRC-95 to set the basis for new allocations at the WRC-97 Conference and undertake the appropriate arrangements to make these new allocations usable for global MSS systems.

Despite these significant concerns, COMSAT firmly believes that it is possible to devise a comprehensive plan to allocate spectrum at 2 GHz to global MSS systems that is economically and technically feasible to implement and consistent with international efforts. This belief is based on our analysis of the impact of MSS downlinks on fixed microwave systems operating in the 2 GHz band. Our studies demonstrate that, contrary to the Commission's assumption in the NPRM, existing fixed services ("FS") in the United States can satisfactorily share spectrum with MSS downlinks, and do not need to be relocated.

Accordingly, COMSAT is proposing an alternative plan to the Commission, which assumes that FS can share spectrum with MSS downlinks, and that MSS uplinks can be accommodated through a two-phase rechannelization of the broadcast auxiliary band. In order for our two-phase alternative plan to work it is critical for the Commission to take the first step to make the remaining WARC-92 bands and the proposed new extended MSS bands available for use in the United States. If this does not happen there would be no reason to

advocate new global spectrum at WRC-95 or WRC-97.

II. THE UNITED STATES IS AT A CRITICAL JUNCTURE IN ITS EFFORTS TO FACILITATE A COMPETITIVE GLOBAL MSS MARKET

The Commission is well aware of the long struggle to secure spectrum at 2 GHz that would be usable for global MSS operations to meet the immediate and long term marketplace demands for satellite-based PCS services. Indeed, the Commission, along with other U.S. government agencies, the U.S. MSS industry and the full international telecommunications community have been engaged since 1989 in efforts to obtain usable MSS spectrum that have yet to be successful. However, time may be running out on any hope that global MSS systems can be authorized to operate at 2 GHz in time to compete with other planned global systems operating in the so-called "Big LEO" bands at 1.6/2.4 GHz. Fortunately, the Commission has initiated this proceeding to allocate spectrum to global MSS at 2 GHz and COMSAT is strongly supportive of this latest effort. We see this NPRM as the best opportunity to bring the broad community of interests together around a comprehensive plan that addresses domestic concerns and facilitates a global solution for 2 GHz MSS systems at WRC-95 and WRC-97.

U.S. efforts to secure spectrum at 2 GHz for global MSS began in 1989 when the Commission initiated a proceeding to prepare for WARC-92. While several candidate bands below 3 GHz were considered for MSS global service, the specific bands at 2 GHz proposed by the United States were rejected by the WARC-92 Conference. Alternative fall back global MSS bands at 1970-2010 MHz (uplink) and 2160-2200 MHz

(downlink) were finally adopted during the closing hours of the Conference after major U.S. delegation efforts.[2] Unfortunately there was no time to develop a transition plan as to how these new MSS bands would be made useful for global MSS service, when other services, including broadcast auxiliary services ("BAS") in the U.S. and fixed microwave operations in many areas around the world, now operate in these bands.

Without a transition plan, the world was not prepared to deal with these bands as new MSS allocations and simply placed a footnote in the table of frequency allocations in the International Radio Regulations indicating that the allocations would not become available for MSS until the year 2005. The U.S. delegation took exception to the 2005 date and indicated in a separate country footnote that these bands would become available for MSS in the United States in 1996. However, it was recognized at the time that it would be difficult for MSS operators to use these new bands, particularly given the existing BAS operations in the 2 GHz band in the United States.

Nevertheless, based on discussions with FCC decisionmakers, we believed that the Commission, as part of the Emerging Technology proceeding, would undertake efforts to clear spectrum at 2 GHz in the United States for new services including MSS. It was our expectation that matters involving the BAS portion of the 2 GHz band would be successfully addressed in that docket and in other domestic proceedings to implement the results of WARC-92. However, the

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[2] See Final Acts of the 1992 World Administrative Radio Conference, Malaga-Torremolinos (1992).

Commission is only now addressing this issue.

On the international front, we believe that much progress has been made to facilitate the use of the WARC-92 MSS bands. At WRC-93, the Conference agreed to an agenda for WRC-95 to consider ways to facilitate the use of the WARC-92 MSS bands and also to consider advancing the date for beginning global MSS operations from the year 2005 to a date earlier than the year 2000. Indeed these are prime issues on the agenda for consideration at WRC-95, and they are being addressed by the Commission in the WRC-95 proceeding which is closely related to this NPRM.[3] Based on developments at the Conference Preparatory Meeting ("CPM") for WRC-95, we believe that the CEPT European countries and others are now prepared to support advancing the date of availability to January 1, 2000. See COMSAT Reply Comments, IC Docket No. 94-31, at 14-15.

While the international community may be moving closer to the U.S. positions taken at WARC-92, the Commission has taken actions which partially nullify the WARC-92 agreement on global MSS allocations. In the initial PCS Order, the Commission decided to allocate portions of both the global MSS uplink and downlink bands to PCS.[4] Fortunately for the MSS industry, the Commission on reconsideration, restored some of the withdrawn WARC-92 allocations for possible use in the United States and committed to initiate a

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[3]See WRC-95 Second NOI, IC Docket 94-31, released January 31, 1995.

[4]PCS Memorandum Opinion and Order, GEN Docket No. 90-314, 9 FCC Rcd 4957 (1994).

proceeding to allocate spectrum at 2 GHz for MSS and to seek additional spectrum for MSS at WRC-95.[5] However, the United States has yet to take a pro-competitive posture internationally to make the 2 GHz MSS bands available globally at an early date.

In the instant proceeding, the Commission is proposing to rectify its actions in the PCS docket by allocating additional spectrum to MSS in the band 2010-2025 MHz, and by deleting the band 1970-1990 MHz, which has been allocated to terrestrial PCS in the United States, from the international table of frequency allocations. The Commission's 2 GHz MSS proposal is creating much uncertainty going into the WRC-95 Conference concerning the availability of MSS spectrum at 2 GHz for global operations. It is quite unusual for one country which unilaterally decided not to implement certain globally allocated bands to then propose that the rest of the world not use these bands. It also is highly unusual for the United States to propose to delete bands in 1995 after the world undertook to allocate them in 1992 with the United States as the strongest advocate. Moreover, there is uncertainty about whether the remaining WARC-92 bands -- not to mention any proposed new band extensions beyond the WARC-92 allocations -- will be usable in the United States for MSS.

Because of the uncertainty surrounding the WARC-92 MSS allocated bands, we believe that the chances of securing new MSS global allocations at WRC-95 are not very good. Moreover, the world is unlikely to support new MSS spectrum, if the United States does not

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[5]PCS Reconsideration Order, GEN Docket No. 90-314, 9 FCC Rcd 6908 (1994).

have a workable transition plan in place to make the remaining WARC-92 bands usable domestically, or on a global basis. For these reasons, we believe it is critical that the United States devise a comprehensive plan which could be implemented over time, with the full cooperation of the international community at WRC-95, to address the concerns of existing U.S. operators in the 2 GHz bands and to remove the technical and economic barriers to global MSS operations at 2 GHz.

III. THE NPRM RECOGNIZES THE DEMAND FOR MSS SPECTRUM AT 2 GHZ AND CONFIRMS THE NEED FOR AN EFFECTIVE TRANSITION PLAN FOR BAS OPERATIONS

In the NPRM, the Commission reiterates its firm belief that a need exists for allocating "substantial amounts of spectrum" for MSS. NPRM at para. 7. We agree with the Commission that there is significant demand worldwide for MSS spectrum to implement state-of-the-art mobile communications services and to provide such communications in remote, or rural, areas not covered by terrestrial systems. We also agree with the Commission that MSS use of frequencies in the 2 GHz band can help to minimize transmission costs and ensure a relatively low service cost to consumers. These points have been well documented in numerous domestic and international proceedings.

However, as the NPRM recognizes, a large part of the 2 GHz band is currently allocated in the United States to the broadcast auxiliary services ("BAS") and there is heavy usage of the band by BAS today. COMSAT supports the Commission's conclusion that BAS transmissions in the 1990-2025 MHz band are not compatible with MSS satellite uplinks at 2 GHz. See NPRM at para 13. COMSAT has conducted a computer

simulation, the results of which are summarized in Appendix 1, which depicts the interference emitted by a typical collection of Electronic News Gathering ("ENG") stations operating at 1.9 GHz in the United States, co-channel with MSS uplinks operating in the 1.9 GHz band. Our simulation confirms that the basic incompatibility of BAS and MSS services is due to the large difference in the transmit power levels of the two services.

As summarized in Appendix 1, the effective radiation emitted by an ENG mobile TV van ranges from 28-35 dBW, due to the combination of transmit power and antenna gain. When these emissions intercept an MSS receive uplink beam, which is attempting to receive a signal from a handheld transmitter operating at an effective transmit power of approximately -1 dBW, the ENG transmissions overwhelm the MSS uplink and compromise the transmission with unacceptable levels of interference. Moreover, the aggregate effect from the sidelobe emissions of hundreds, or thousands, of ENG trucks operating at the same time will severely degrade the performance of handheld MES uplinks in the 2 GHz band. Indeed, our analysis indicates that ENG stations in the United States are capable of producing these high interference levels at the satellite and impact handheld MSS users at 2 GHz located well outside of North America. See Appendix 1, infra.

Given the significant harmful impact of BAS/ENG facilities on MSS operations, COMSAT agrees with the Commission that BAS must be cleared from a portion of the 2 GHz band to provide interference-free spectrum for global MSS uplinks at 2 GHz. For that reason, we believe it is imperative that any proposal to allocate spectrum in the United States

at 2 GHz to global MSS systems include a realistic and cost-effective transition plan for BAS operations. However, as we will show in Section V, we do not believe that it is necessary to relocate BAS incumbents to a different portion of the 2 GHz band as part of the transition process.

IV. THE COMMISSION'S PROPOSAL, HOWEVER, IS NOT ECONOMICALLY FEASIBLE AND IGNORES IMPORTANT INTERNATIONAL CONSIDERATIONS

In the NPRM, the Commission proposes to allocate 70 MHz of spectrum at 2 GHz to MSS. NPRM at para. 8. The Commission's proposal incorporates part of the WARC-92 global MSS allocations at 1990-2010 MHz and 2170-2200 MHz for MSS uplink and downlink operations, respectively. In addition, to adjust for the spectrum already allocated in the United States to terrestrial PCS, consequently provide 35 MHz of spectrum in each direction, the Commission proposes to extend the MSS uplink band to include an allocation for global MSS at 2010-2025 MHz and to extend the global MSS downlink band to include spectrum at 2165-2170 MHz.

The NPRM further proposes to relocate BAS incumbent users in the 2 GHz MSS uplink band at 1990-2025 MHz to the 2110-2145 MHz band which is currently occupied by fixed services ("FS") and requires that MSS pay for the BAS relocation. NPRM at para. 9-10. Because the Commission believes BAS and FS systems cannot share spectrum, it also proposes that MSS pay to relocate the FS links at 2110-2145 MHz which are paired with links operating at 2160-2195 MHz.[6] The Commission indicates that it does not believe this double relocation expense is

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[6] See Figure 1, attached hereto, which illustrates the Commission's proposed re-allocation of the 2 GHz band.

unduly burdensome for MSS because it assumes that MSS would have to move the FS links out of the 2160-2200 MHz band in any case. NPRM at para. 10.

COMSAT cannot support the Commission's 2 GHz MSS allocation proposal because of the significant costs associated with the relocation of both FS and BAS users in the 2 GHz band. In addition, the Commission has failed to devise a plan to make the MSS uplink and downlink band extensions usable internationally. However, as we demonstrate in our alternative plan in Section V, there is no need to relocate existing FS 2 GHz users in the United States, because our studies demonstrate the strong potential for sharing this spectrum, and there is every reason to believe that a comprehensive transition plan to allocate new MSS spectrum at WRC-97, with arrangements to make the spectrum usable for MSS, can be successful.

A. The Cost to Relocate Both FS and BAS/ENG Facilities Is Prohibitive

COMSAT believes that the costs associated with the Commission's proposal to relocate the FS and BAS facilities that currently occupy the 2 GHz bands in the United States would make it economically impossible to implement any global MSS systems at 2 GHz. Based on information obtained in the Commission's WRC-95 Industry Advisory Committee 2 GHz Transition Plan Ad Hoc Group ("Ad Hoc Group"), COMSAT estimates that there are approximately 10,150 paired microwave paths in the common carrier ("CC") bands at 2110-2130/2160-2180 MHz and the

private operational fixed ("POF") bands at 2130-2150/2180-2200 MHz.[7] The Ad Hoc Group estimates that the cost to relocate the existing CC and POF microwave operations in the United States is at least $2.5 billion assuming a relocation cost of $250,000 per paired microwave path. This estimate is based on the assumption that, at a minimum, microwave antennas, frequency-generation equipment, and transmission lines would need to be replaced to permit CC and POF microwave operations at higher frequencies such as 6, 11, and 13 GHz.

The significant $2.5 billion dollar cost associated with this aspect of the Commission's proposal is roughly equal to the entire $2.6 billion projected cost of the fully implemented I-CO MSS system. Moreover, the $2.5 billion figure only reflects the cost to relocate FS microwave systems currently operating in the United States. It does not take into account additional potential costs associated with the Commission's proposal to retune BAS operations, or to auction MSS licenses -- a cost factor we will discuss in Section VI. Nor does it reflect the impact these substantial up-front investments will have on the cost for 2 GHz MSS service.

Regarding BAS operations, the Commission has proposed to clear 35 MHz of BAS spectrum at 1990-2025 MHz and to add 35 MHz of bandwidth at

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[7] See Table 1, attached hereto. As shown in Table 1, there were over 20,300 licenses assigned, as of year-end 1994, in the 2 GHz band to CC and POF services, with each license representing one-half of a paired microwave link. The combined total number of CC and POF microwave paths has remained fairly constant since 1991. However, during the period 1991-1994, the number of licensed POF paths decreased, apparently due to the Commission's actions in ET Docket No. 92-9, 7 FCC rcd 6886 (1992), while the number of CC paths increased, presumably due to the growth in the cellular industry.

the back end for ENG to operate across the 2025-2145 MHz band. We estimate that there are approximately 9,000 ENG transmitters and 7,000 ENG receivers in use today.[8] Based on information obtained from one of the largest ENG manufacturers, we believe that it may cost $3,000 per transmitter and $1,000 per receiver to retune the newer type of analog ENG equipment, which represents about 20% of the existing market. However, considering that as much as 80% of the ENG equipment in use today consists of older analog equipment which may be more difficult to retune, the costs to modify the vast majority of ENG equipment could be as high as $18,000 per transmitter and $25,000 per receiver.[9] If this is the case, our estimate of the total costs associated with the Commission's proposal to relocate BAS could exceed $275 million.

When the cost to relocate ENG operations is combined with the cost to relocate existing CC and POF facilities, the total relocation

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[8]The total number of ENG transmitters and receivers in based on the year end 1994 total number of 1500 television stations and assumes an average of 6.2 ENG transmitters and 4.5 ENG receivers per station. See Williams, K.T., "Report on the NAB 2 GHz TV Auxiliary Facilities Survey", January 7, 1992.

[9]The newer type of ENG equipment allows the mobile units to operate in the 1990-2110 MHz band on a primary basis and permits operation in the 2450-2500 MHz band on a secondary basis to industrial, scientific and medical ("ISM") users and Big LEO systems operating downlinks in the 2483.5-2500 MHz band. The older type of ENG equipment only permits operations in the 1990-2110 MHz band.

In determining the engineering costs to retune ENG facilities, we assumed that the antenna and feed lines have sufficient bandwidth to operate in the extended 2110-2145 MHz band without modification. However, the frequency generation devices, amplifiers and filters in the older equipment, or the electronically programmable read-only memories ("EPROMs") in the newer equipment, would have to be replaced. Our estimates do not include any allocation for the administrative costs involved in planning for the ENG equipment transition program or for storage of equipment awaiting modification.

expense associated with the Commission's proposal approaches $3.0 billion. This combined expense will likely have a substantial impact on service costs. Most of the planned global MSS systems contemplate offering service to end-users at between $1.00 and $2.00 per minute. If relocation costs, just to access the U.S. market, are pushed above $3.0 billion and the combined costs of relocation and building the system exceed the $5.0 billion mark, the service price per minute would have to rise appreciably. We believe that service prices beyond the $2.00 - $3.00 per minute level would result in a dramatic drop-off of customers in the mass market, leaving only the wealthy, international business traveller as customers. Global service provided only to a niche market is unlikely to succeed.

In addition, for a global MSS system, the FS relocation costs would no doubt be multiplied many times more, as other countries would likely follow the precedent set by the United States in demanding that MSS providers bear all of the cost of relocating FS systems which have frequency overlaps with MSS. Should this happen, the relocation cost of FS facilities around the world would be a staggering amount. In effect, no sound business decision could be made to proceed with plans for an MSS system under these conditions.

Even if other countries did not impose FS relocation expenses on MSS operators, the U.S. relocation cost is significant enough by itself -- without the additional prospect of spectrum auctions to access the domestic market -- that prospective MSS operators will likely choose either not to enter the U.S. market, or not to launch at all. Neither of these results would be in the public interest, as

they would undermine the Commission's objectives in this NPRM to provide the American public with access to new and competitive MSS services and technologies to stimulate the economy and to create new, high technology jobs in the United States.

B. International Concerns Likely Will Prevent the Commission's Plan From Being Adopted at WRC-95

As mentioned earlier in this filing, COMSAT believes that the world is simply not ready to make new MSS allocations at WRC-95, such as the 15 MHz MSS uplink band extension at 2010-2025 MHz and the 5 MHz downlink extension at 2165-2170 MHz proposed by the Commission in the NPRM. See Section II, supra. Without adequate study by the ITU-R on MSS sharing with terrestrial FS systems in frequency ranges beyond the "core" WARC-92 allocations, it is highly unlikely that the international community will allocate any new spectrum to MSS even at WRC-97. The reactions of the administrations participating in the WRC-95 CPM, which took place recently in Geneva, and the draft country proposals to WRC-95 that we have been able to review to date, confirm this view.

However, the Administrations did pledge at the CPM to give favorable consideration at WRC-95 to a "evolving approach for the introduction of new MSS [at 2 GHz]."[10] The "evolving approach" encourages Administrations to observe the new FS channelling plan, set forth in ITU-R F.1098, which attempts to avoid significant overlap between the 2 GHz frequencies utilized by the MSS global uplink and downlink bands and by the newer, largely digital radio relay stations

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[10]Report of the Conference Preparatory Meeting for WRC-95 and WRC-97, CPM 95/118, April 4, 1995, at 37 ("CPM 95 Report").

which currently operate in portions of the 2 GHz band. The approach is intended to accommodate the concerns of developing countries which have already made substantial investments in new FS equipment at 2 GHz to replace older, analog terrestrial stations. See CPM 95 Report, at 36.

Future WRCs can only consider new MSS allocation proposals after some preliminary work and studies have been performed by the ITU-R. Even with favorable recommendations by the ITU-R, foreign administrations will likely insist on a delayed date of access for new MSS bands anywhere in the 2 GHz range, in order to allow time for their terrestrial interests back home to make adjustments, through retuning or relocation to alternative bands -- the same process which we are only starting to deal with in the United States in this proceeding.

Given these concerns regarding the international allocation process, it is imperative that the Commission adopt a more realistic 2 GHz band extension proposal based on the "evolving approach" adopted at the CPM, if there is to be any hope that the U.S. will succeed in securing additional spectrum for global MSS at WRC-97. COMSAT believes a more realistic goal is for WRC-95 to identify potential candidate MSS bands below 3 GHz, to implement a program to study these candidate bands, and to come back at WRC-97 to allocate the most appropriate bands to new MSS. We believe that our alternative plan presents such a solution.

V. COMSAT'S ALTERNATIVE PLAN ENSURES THAT SPECTRUM AT 2 GHZ WILL BE USABLE FOR GLOBAL MSS OPERATIONS

COMSAT has developed a two-phased alternative plan for the 2 GHz band which is based on the premise that FS can share spectrum with MSS downlinks and that MSS uplinks can be accommodated through a gradual rechannelization of the BAS band. Our plan can succeed, we believe, with the full support of the Commission, the U.S. MSS industry and in close coordination with other countries who must be full partners if the objectives of a competitive, global MSS market are to be achieved. While the Commission's proposal is far too costly to implement, it readily lends itself to modifications that could make it workable. As discussed herein, we believe our alternative plan can accomplish the Commission's objectives in the NPRM in a manner consistent with the interests of all concerned parties and at a cost that does not preclude MSS use of the 2 GHz band.

COMSAT's alternative plan contemplates that the Commission will proceed in two phases to allocate sufficient, usable spectrum at 2 GHz to global MSS systems. In Phase One, the Commission would undertake several actions in this proceeding and at WRC-95 to make a portion of the 2 GHz global MSS bands allocated at WARC-92 (i.e. the 1990-2010/2170-2200 MHz bands) available for global MSS operations commencing in 1998. In Phase Two, the Commission would undertake additional steps to evaluate and allocate its proposed MSS extension bands at 2010-2025/2165-2170 MHz and to make these bands usable for global MSS operations commencing by 2005.

A. Phase One: Implementing the WARC-92 MSS Allocations

The first step in Phase One is to demonstrate and reach agreement in this proceeding that MSS can share the WARC-92 MSS downlink band at 2160-2200 MHz with fixed services. Based on computer simulations conducted by COMSAT LABs, which are summarized in Appendix 2, we are convinced that MSS can share downlink spectrum at 2160-2200 MHz with FS operations in the United States without harming the quality of the existing FS services operating in the 2 GHz band. COMSAT also believes that Personnel Earth Station ("PES"), handheld terminals of the I-CO satellite network can co-exist with the existing density of microwave stations in band by using automated interference avoidance techniques.

The computer simulations depict the sharing situation between the I-CO MSS system and the existing CC and POF microwave receive stations located in the 2160-2200 MHz band. As noted in Appendix 2, we took great care to use the most realistic parameters to estimate the actual, operational characteristics of current CC and POF microwave systems. Comparing the microwave characteristics against those of the I-CO satellite network, COMSAT found that sharing between MSS and fixed microwave is indeed quite feasible in the 2 GHz bands.

Accordingly, we do not believe that it is necessary to relocate the POF and CC microwave installations in the paired bands 2180-2200 MHz/2130-2150 MHz and 2160-2180 MHz/2110-2130 MHz, respectively, to accommodate at least some global MSS operations at 2 GHz beginning in 1998. This one key change from the Commission's proposal, which assumed that FS could not share spectrum with MSS downlinks, saves

approximately $2.5 to $3.0 billion by avoiding the unnecessary, costly, and time-consuming wholesale relocation of some 10,000 terrestrial microwave stations currently operating in the United States.

As a second step under Phase One, we propose that the Commission implement a program to retune the center frequencies and corresponding bandwidth of each of the seven BAS/ENG channels in the 1990-2110 MHz band.[11] Our rechannelization plan would reduce the seven analog FM/TV BAS channels to a uniform bandwidth of 16 MHz each, in the 1998-2110 MHz band, thereby freeing 8 MHz of bandwidth at 1990-1998 MHz for use by global MSS systems beginning in 1998. The rechannelization of the BAS/ENG band would not require the relocation of terrestrial fixed operations to another part of the spectrum and would have a negligible effect on the quality of BAS operations.[12]

Moreover, we believe the cost to undertake the necessary ENG equipment modifications would not be unduly prohibitive. We estimate the cost to simply retune the roughly 9,000 ENG transmitters and 7,000 ENG receivers in use today could total approximately $35.0 million -- a figure considerably less than the $3.0 billion price tag associated with the Commission's proposed wholesale relocation of the first two BAS channels. Our estimate is based on information received from a large ENG equipment manufacturer, which indicates the per unit costs

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[11] See Figure 2, attached hereto, which presents the salient features of COMSAT's proposed rechannelization of the BAS 2 GHz band.

[12] See Appendix 3, attached hereto, which demonstrates that our proposed BAS rechannelization would have a negligible impact on the quality of BAS operations.

to retune the ENG equipment will be $3,000 per transmitter and $1,000 per receiver. Moreover, unlike the proposal in the NPRM, we believe that only a fairly simple retuning of the frequency synthesizer will be required since the BAS band will just be reduced by 8 MHz.

As a third element of Phase One, the United States must address the related international allocation and coordination issues involving the 2 GHz band which are under consideration at WRC-95. In particular, the U.S. must work with other countries at WRC-95 to make available on a global basis by the year 2000 at least a portion of the WARC-92 allocated spectrum for MSS beginning with the bands 1990-2010 MHz and 2170-2200 MHz for MSS uplink and downlink operations, in the United States respectively. This effort is critical to accomplishing I-CO's plans to deploy its non-GSO MSS system in the 2 GHz band beginning in 1998. Moreover, the availability of MSS spectrum before the year 2000 is crucial to resolving system coordination issues for MSS systems operating in the L-band at 1.5/1.6 GHz and 1.6/2.4 GHz, and, thus, will ensure the development of a robust, competitive global MSS marketplace.

The U.S. also must support efforts at WRC-95 to make additional WARC-92 spectrum available for MSS as conditions warrant around the world, for example in the bands 1990-2010 and 2170-2200 MHz from around the year 2000. For example, the U.S. should encourage the adoption at WRC-95 of the worldwide MSS/FS transition plan discussed at the WRC-95 CPM which would permit Administrations to consider a number of options to relocate FS systems and accommodate MSS in the 2 GHz band. In addition, the U.S. must develop and support proposals at